

13 MAR 1997

CESAJ-RD
199404532 (IP-BB)

MEMORANDUM FOR RECORD

SUBJECT: Record of Decision

1. Applicant: South Florida Water Management District
2. Location, project description, existing conditions:
 - a. Location: The Everglades, Broward, Hendry, and Palm Beach Counties, Florida.
 - b. Project Description: Construction of several Stormwater Treatment Areas (STAs). Water will be diverted to the STAs through new and modified levees, canals, and control structures. The works authorized by the permit instrument are simply interim steps toward the final water treatment targets. The permit instrument provides milestone dates for actions to identify the additional construction or other actions as needed to achieve the final (long-term) phosphorus target. Related work includes the modification of existing canals and levees to spread the discharge water from the STAs across the northern edges of the Rotenberger tract and Water Conservation Areas 2A and 3A. The work is broken up into components that will be constructed over time. These components are more fully described in the accompanying permit instrument, however, in summary, the components authorized at this time are: STA-1-West; STA-2, including the hydropattern restoration feature; STA-5; STA-6; and West WCA-3A hydropattern restoration feature. The following components are not authorized at this time until the application is modified based on ongoing planning activities: STA-3/4, including the hydropattern restoration feature; and, Northern L-8 Basin Improvements. STA-1-East was part of the original application but now has been authorized by the Water Resources Development Act of 1996.
3. Basic project purpose: The primary purpose is to reduce nutrient loads of stormwater and runoff from the Everglades Agricultural Area (EAA) prior to distribution into the Everglades Protection Area (EPA) and Rotenberger. The project as proposed herein is to achieve an interim target discharge of a long-term

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annual flow-weighted mean phosphorus concentration of approximately 50 parts per billion (50ppb). The secondary purpose is to improve hydropatterns in the northern edges of the EPA and within the Rotenberger Tract in the EAA.

4. Statutory authority: Section 404 of the Clean Water Act.
5. Other Federal, State, and Local authorizations obtained or required and pending:

- a. State Permit/Certification: The Department of Environmental Protection, by letter dated May 31, 1996, waived water quality certification for this project.

- b. Seminole Tribe of Florida. The U.S. Environmental Protection Agency advised the Corps and the Seminole Tribe that the project certified by The State of Florida may affect the waters of The Seminole Tribe of Florida, in accordance with 33CFR325.2(b)(1)(i). The Seminole Tribe issued water quality certification for STA-5 and STA-6 project on January 21, 1997.

- c. Miccosukee Tribe of Indians of Florida. This tribe holds a perpetual lease to 189,000 acres of Water Conservation Area 3A. Water from this project will flow across these lands. The U.S. Environmental Protection Agency advised verbally that the notification under 33CFR325.2(b)(1)(i) was not applicable in this circumstance.

- d. Coastal Zone Management (CZM) consistency/permit: The Florida Department of Community Affairs, by letter dated December 6, 1996, stated the project is consistent, at this stage, with the Florida Coastal Zone Management Program.

- e. Other authorizations: It is anticipated the Florida Department of Environmental Protection will, prior to discharge of waters from the works authorized by this permit, be issuing an operating permit in accordance with State rules and a National Pollution Discharge Elimination System (NPDES) permit in accordance with Section 402 of the Clean Water Act. Ordinarily, before issuance of a Section 404 permit, water quality issues have been clearly addressed and the Corps can simply examine decisions by agencies with expertise and special authorities in those matters to determine whether limitations and conditions imposed by such agencies protect the public interest. In this

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case, such decisions have yet to be made. It is the Corps' intention to review this permit when applicable water quality permits are issued by U.S. Environmental Protection Agency and/or the Florida Department of Environmental Protection and, where possible, and consistent with the law and the public interest, to conform this Section 404 permit to those permits.

6. Date of the Public Notice and summary of comments:

a. The application was dated August 29, 1994. A draft Programmatic Environmental Impact Statement (PEIS) was prepared. A public notice on October 24, 1995 requested comments on the application and the draft PEIS. Public hearings were held on November 27 and 28, 1995, in Key Largo and Clewiston. The Corps' stated, by letter dated February 14, 1996, its position on project. During several meetings during the day of February 16, 1996, Corps and SFWMD staff discussed the individual issues and the additional information required to complete review of the application. The SFWMD and Corps staff met periodically from March to September, 1996, on resolution of those issues and in preparation of the revisions to the PEIS. A second public notice dated August 13, 1996 advised of the availability of certain documents drafted by the South Florida Water Management District (the applicant) in response to some of the comments received from the public. The Corps participated in a public workshop hosted by the applicant on August 22, 1996. A third public notice, dated October 4, 1996, advised of the availability of the Final PEIS and requested comments. A public meeting was held on October 22, 1996, in West Palm Beach. A fourth public notice, dated November 22, 1996, extended the comment period to December 3, 1996. Comments received on the Draft PEIS are found in the Final PEIS. A draft permit instrument was circulated in December. In response, the SFWMD prepared a rewritten document that through several meetings went from version #4 to #11. Then representatives of the Corps, Florida Department of Environmental Protection (FDEP), U.S. Environmental Protection Agency (USEPA), the Department of the Interior, and Florida Game and Fresh Water Fish Commission (FGFWFC) continued discussions and resulted in version #13. A revised draft permit instrument was circulated on February 25, 1997. During these revisions, several meetings and teleconferences were held and a host of interested public parties commented and suggested alternatives. The following summarize comments received after October 4, 1996.

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(1) Tim Searchinger, Environmental Defense Fund, expressed: the likely need for phase II clean-up plan to reach 10ppb; the reason for accelerated research into algal polishing cells; the need for interim deadlines in the permit; and, the dangers of early hydropattern restoration. By e-mail dated December 27, 1996, suggested permit language changes to: recognize the EPA must approve the adopted water quality standard; to accelerated the piloting of a periphyton STA; to include, in the plan for implementing Phase II, all necessary funding and approvals; inclusion of 28% increase in flow in the submission of an operational plan; By telephone on February 27, 1997, suggested: addition of requirement to implement by EFA date; not 28% increase until discharge able to meet the 80% reduction of the Consent Agreement; set a trigger on STA-2 discharge based on rate of change; tougher "best effort" for implementing STA-2 Phase II. By telephone on February 28, 1997, noted that Everglades is a unique wetland in that it is a non-reducing wetland (high oxygen) so low phosphorus in soil is essential. By letter dated March 5, 1997, suggests, for STA-2, incorporation of a provision to determine if the rate of soil phosphorus build-up exceeded the predictions of the mass-balance model after two years and, in return for a defined trigger, the SFWMD would commit to piloting periphyton STAs.

(2) Mr. Robert M. Norton, by letter dated September, 1996, expressed concern that the existing water quality standards and SWIM plan for agricultural runoff water are not being enforced. By letter dated October 7, 1996, asking for the Corps support in encouraging SFWMD enforcement program. By letter dated October 13, 1996, suggests stop permitting new landfills and projects that result in water being pumped back into the ecosystem. By letter dated March 1, 1997, concerned the Corps does not follow up on water quality testing and SFWMD does not enforce their water quality standards.

(3) U.S. Department of Housing and Urban Development, by letter dated September 26, 1996, stated there will be no significant adverse impact on any HUD programs.

(4) BioChem Technologies, Inc., by letter dated October 4, 1996, provided a comparison between their treatment technology and others in Appendix L of the PEIS. By letter dated March 4, 1997, asked to be added to the list of technologies in the

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permit. Also provided copies of letter of support for their application for grants from SFWMD and others.

(5) South Florida Regional Planning Council, by letter dated October 9, 1996, found the study to be generally consistent with regional policy and goals.

(6) Florida Power and Light Company, by letter dated October 17, 1996, concerned the evaluation does not address how costs will be allocated and the economic impact of that allocation, and also must consider the location and potential impacts to FPL lines.

(7) The Miccosukee Tribe of Indians of Florida, represented by Lehtinen O'Donnell Vargas & Reiner, by letter dated October 21, 1996, states its comments in its letter of January 4, 1996, were not addressed in the PEIS and reiterates them. By letter dated December 2, 1996, states: concern that the FPEIS suggests that short-term impacts are outweighed by regional benefits in the WCAs; the statement that 50ppb will be better quality than now is incorrect; recommends bypass of the flows until can meet the water quality standards; is a lack of emphasis on the Federal trust responsibility for to protect Tribal lands; disagrees that discharge of 50ppb water is appropriate; that there are violations of water quality standards in the ENR discharge despite the statement in the PEIS; recommends development of monitoring plans before issuance of the permit; opposes the FDEP administering the NPDES permits; notes the Consent Decree is binding, not the EFA; the FPEIS does not recognize the EFA states the 28% increased flows must be achieved without adversely affecting water quality; and supports the bypass option for STA-2. By letter dated March 4, 1997, suggested changes in the permit language: remove "best effort" from STA-2 language; not allow discharge into WCA-3A until written agreement for such discharges from Tribe and other agencies; reference the 80% reduction agreement in the Consent Decree; reference the Miccosukee Tribal water quality criterion in special conditions for WCA-3A and elsewhere; require SFWMD to implement pilot projects for supplemental technologies; add requirement to evaluate supplemental technologies to quantify the potential removal of micronutrients or other changes whether the water will be "marsh ready"; in the operational plan, specify "how the 28% increase will occur and how the 80% reduction in phosphorus will occur; installation of water monitoring stations

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within the WCAs; add the Tribe as a recipient of various monitoring reports; in the special condition that the permittee would advise the Corps of issues that conflict with the Tribe's rights, add notification to the Tribe; and, provide copies of reports to the TOC.

(8) Dr. Ronald D. Jones, Southeast Environmental Research Program, Florida International University, by letter dated October 22, 1996, states: concurrence with general conclusion of mercury plan; desktop evaluation of alternatives is useless; 1995 BMP report is deceptive; hydropattern should not be done with 50ppb water; critiques the mass-balance model in the hydropattern evaluation; and, we can wait for hydrologic restoration but not for nutrient pollution.

(9) Florida Game and Fresh Water Fish Commission, by letter dated October 29, 1996, expressed various concerns over the adequacy of the analysis of impacts from hydropattern restoration; mitigation for Brown's Farm; the hydrologic target for Rotenberger; and the recreational use of STAs. By letter dated December 16, 1996, information was provided on the use of Brown's Farm by hunters.

(10) Sierra Club, Broward County Group, by letter dated October 31, 1996, generally expresses support that better expenditure of taxpayers money will be to clean up the water to a standard better than proposed by the STAs due to the nutrient impacts on the Everglades, among other specific comments.

(11) Florida Biodiversity Project, by letter dated October 31, 1996, states: the approach of building STAs then Phase II is wrong but should do both now; PEIS emphasizes chemical treatment in alternatives review and that STAs design could be more efficient; hydropattern restoration should not be implemented prematurely; STAs do not replace dynamic water storage capacity lost from historic Everglades; and concern 50ppb will cause methylation of mercury. By letter dated March 6, 1997, draft language: is ambiguous on the performance standard of the STAs, particularly whether the standard is measured at the point of discharge; for STA-2, in the definition of "adverse" impacts; and, for STA-2, suggest using historic levels of soil phosphorus rather than rate of accumulation.

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(12) The Technical Oversight Committee, by letter dated November 1, 1996, recommends the current plan for hydropattern restoration.

(13) The United States Environmental Protection Agency, by letter dated November 1, 1996: verifies the EPA's and NPDES mercury sections; supports the STA approach; and noted some comments to the DPEIS were not replied to in the FPEIS. By letter dated December 5, 1996: supports STAs; feels localized ecological impacts can be avoided in hydropattern restoration through appropriate special conditions; and that Phase II be expedited.

(14) The Florida Sugar Cane League (FSCL), represented by Environmental Services and Permitting, Inc., by letter dated November 4, 1996, expressed concern the PEIS does not discuss the post 1988 water quality data, particularly: the effects of the reduction levels by BMPs; that ENR data shows STA performance should be better than expected; that the SFWMD October, 1996 "Water Conditions Report" states "Phosphorus levels in the Refuge have remained below both the interim and long-term concentration levels since June 1995."; that they cannot comment on monitoring plans that are not detailed in the PEIS and is concerned with unnecessary costs; feels the PEIS statement that the ECP will improve water quality in Florida Bay is incorrect since there is no relationship between the two; noted that very little of the Everglades has elevated phosphorus levels; the PEIS does not include several SFWMD papers on the link between phosphorus and cattails; there is no analysis of reservoirs; and that FSCL supports the ECP. By telephone on March 6, 1997, concerned with permit language: whether a violation would result if the actual results differ from the mass-balance model that is "incorporated" into the permit; and, whether "imbalance" is defined as the elimination of periphyton species, and, for the rest of that special condition, the definition of imbalance is not clear.

(15) The Sugar Cane Growers Cooperative of Florida, (Cooperative), represented by Hopping Green Sams and Smith, by letter dated November 4, 1997, expressed concern the PEIS is incomplete and provided the following specific comments: the phosphorus reduction by BMPs is actually 68% instead of the 25% assumed in the PEIS so the tables in the PEIS overstate the reduction in phosphorus resulting from the STAs; phosphorus measurements in WCA-2A do not show a moving nutrient front;

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current water quality data state the nutrient standards have been met in the ENP without the STAs; PEIS does not discuss uncertain STA performance; PEIS does not answer the Cooperative's consultant's conclusion that decrease in phosphorus will result in an increase in mercury; the mass-balance model in Appendix M is not useful as a predictive tool; and, that the mid-course correction process in the EFA is a "two way" review that could result in acceptance or rejection of STAs 3/4. By letter and meeting dated December 18, 1996, the Cooperative suggested revisions to the draft permit instrument to exclude numerical phosphorus limitation and compliance schedules since these are more properly placed in the State operating permit. By letter dated March 6, 1997, the Cooperative states: the Corps lacks authority to impose restrictions on STA discharges (of water); the Corps misconstrues the EFA as requiring the criterion to be applied to the discharge pipe; by requiring the use of 10ppb as a design parameter, restricts the State's discretion under the EFA and will improperly bias the State's deliberation of the standard; and the use of the 10ppb as a default standard conflicts with the EFA provision authorizing State courts to stay implementation of that default.

(16) Seminole Tribe of Florida, represented by Lewis, Longman & Walker, by letter dated November 5, 1996, provided specific comments: suggest adding language clarifying their rights under the Water Rights Compact; note that there are several issues to resolve prior to construction of STA-6 (rights of way, completion of an entitlement study, construction of works for substitute irrigation water, and water quality certification); that the statement in the PEIS that the West WCA-3A will be improved conflicts with the Appendix which shows the opposite; the designs and plumbing of STA-5 in the PEIS are not the current ones; and, correction of the population numbers of the Seminole Tribe. By telephone on February 28, 1997, the representative for the Tribe asked if the water quality certification will be incorporated into the permit and agreed to check if the revised draft changed anything on their certification. By letter dated March 3, 1997, the representative confirmed his feeling that the changed language in the draft does not impact the certification.

(17) United States Sugar Corporation, represented by Gunster, Yoakley, Valdes-Fauli & Stewart, by letter dated November 4, 1996, adopts and incorporates as their own the

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comments by the Florida Sugar Cane League, Inc. By telephone on March 7, 1997, the representative expressed verbally these concerns: the permit is beyond the authority of Section 404 of the Clean Water Act; generally inconsistent with the EFA; supplanting process under EFA to develop numeric criterion; ambiguous in defining "adverse effects"; and unquantifiable costs in developing the mass-balance model for STA-2 and Rotenberger.

(18) Ms. Juanita Green, by letter dated December 2, 1996, objects to issuance of the permit because we do not yet know what additional treatment will be needed.

(19) National Audubon Society, by letter dated December 2, 1996, that was coordinated with Florida Audubon Society, states: supports STA; concerned about change in land use/development of the C-51/STA 1 East basin; rejects the bypass option for the hydropattern restoration feature of STA-2 but believes is essential to expedite the Phase II implementation. By telephone on March 4, 1997, representative from Florida Audubon indicates written comments coming but expressed concern over the definition of "best effort" and why only used for STA-2? By letter dated March 5, 1997, suggests: using 10ppb as the design standard independent of the State water quality standard since there is sufficient evidence that this is an appropriate level; "shall make best effort" is undefined and should be replaced with "shall place into operation" for STA-2; place an analysis related to removal of micronutrients ("marsh ready" water) into the analysis of alternative technologies; clarify that the permittee is responsible for funding and carrying out the supplemental technology investigations, etc.; place in specific language what pilots are expected; and, not allow 28% increase until water is treated at 10ppb.

(20) Everglades National Park, by letter dated December 3, 1996: concurred with the conclusion that STAs will not exacerbate bioaccumulation of mercury; that a schedule be produced with the goal of having Phase II design available when the final phosphorus standard is set; support the current plan for hydropattern restoration; suggest submission of a plan describing how the STAs will be operated; and, delay 28% increase flow until Phase II.

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(21) The Florida Department of Community Affairs, Florida State Clearinghouse, by letter dated December 6, 1996, provided copies of comments from the Florida Game and Fresh Water Fish Commission (see paragraph (9)), the Florida Department of Environmental Protection (FDEP). The FDEP states: the benefits of hydropattern restoration outweigh the possible risk of vegetative community changes; implementation of Phase II be accelerated; the ENR and BMP results indicate better than expected performance; effects of a delay in STA construction may be a bigger risk than the risk from mercury effects.

(22) American Association for the Advancement of Science, by letter dated December 20, 1996, forwarded a copy of a research report by Dr. Englehardt's summer research as a Fellow at the EPA. The report is entitled "Benefit-Risk Analysis of Everglades Stormwater Treatment Area Phase I Discharge Analysis". The study supports the bypass plan of STA-2, the current plan for WCA-3A-East, and the bypass plan for WCA-3A-West.

7. Alternatives:

a. Avoidance (no action, uplands, availability of other sites): The no action alternative would not allow for project completion. This project is the result of a long series of efforts to identify the needs of the Everglades ecosystem as described in section 3.0 of the PEIS. One of the concerns is the changes resulting from the introduction of phosphorus in the water flowing into the Everglades Protection Area. The increase of this nutrient has been correlated to the loss of periphyton mats, microorganism populations, and the growth of cattail. For example, Appendix M of the PEIS presents correlations based on historic measurements of phosphorus inflows and the spread of cattail based on data from WCA2A, and this correlation is used to predict a range in acres of the future growth of cattail for the "do nothing" options for each STA with a hydropattern restoration feature. Estimates of the reduction of the quantity of phosphorus resulting from the operation of the STAs are provided by Tables 3.0-3, 4, and 5 of the PEIS. One commentator notes that the implementation of BMPs within the Everglades Agricultural Area has resulted in the substantial reduction in the quantity of phosphorus flowing to the prospective STAs. The commentator provided substitute tables that reflected that the STAs will achieve a smaller load reduction (ranging from 4% to 25%) than that described by the PEIS (ranging from 41 to 52%).

Nevertheless, the STA still will be removing phosphorus. The same commentator provided estimates that indicates the reduction in phosphorus tons within the STAs would be but a small percentage of the total input of phosphorus from atmospheric deposition. However, no matter what the percentage, the "do nothing" alternative results in a continuation of addition of phosphorus into the ecosystem. In addition, the presence of an STA at the point just before discharge is desirable since this provides for treatment of water that was not captured by BMPs (such as Lake Okeechobee releases or municipality discharges) and also provides for any variations in the various landowners' implementation or success of BMPs in any one drainage basin.

b. Minimization. The use of the STA design was compared to other potential methods of treatment in the PEIS at Section 3.0 and Appendix L. Thirty nominated technologies were culled to a list of 24, which in turn were evaluated against eight factors. Then the resulting seven technologies were evaluated in more detail. The technology with the smallest acreage was direct chemical treatment with either direct filtration or dissolved air. However, there is serious concern that this process will remove micronutrients from the discharge water that may be needed by the ecosystem and that the discharge water will retain residual treatment chemicals that may be damaging. Since the impacts on the ecosystem have not yet been studied there is no way to assess this concern. The output could be buffered or polished by placing a marsh downstream of the chemical treatment plant. However, this has the disadvantage that the final discharge from the marsh could not be expected to fall as far as 10ppb. Even though the final phosphorus standard has not yet been established, the treatment technology should be able to have the flexibility to reach 10ppb since that is the default standard by law. So, a third option is to place the chemical treatment after the marsh. This provides flexibility at slightly higher acreage but lower cost. Just looking at these three and STA, Appendix L shows the following for a "basin" (approximately 1/5 of the EAA).

(table on following page)

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| ppb in - ppb out | 150-50 | 150-30 | 150-10 | 90-50 | 90-30 | 90-10 |
|----------------------------|--------|--------|--------|--------|--------|--------|
| Acres | | | | | | |
| Chemical Treatment | 875 | 1501 | 3230 | 421 | 880 | 2112 |
| Managed Wetland | 3685 | 7865 | n.a. | 1757 | 5882 | n.a. |
| Marsh then Chemical | 8151 | 8362 | 8598 | 4444 | 4663 | 4886 |
| STA | 8151 | 12122 | n.a. | 4444 | 8464 | n.a. |
| 50 yr Present Worth | | | | | | |
| Chemical Treatment | 220.05 | 261.14 | 353.08 | 169.17 | 222.88 | 318.92 |
| Managed Wetland | 212.86 | 253.40 | n.a. | 158.40 | 199.05 | n.a. |
| Marsh then Chemical | 163.28 | 245.58 | 338.83 | 126.81 | 211.74 | 309.47 |
| STA | 163.28 | 202.31 | n.a. | 126.81 | 166.36 | n.a. |

So several "decision paths" could be defined. Three are defined here out of many possible. The first path could be to implement Chemical Treatment for 50ppb now, then when the final numeric standard is set (hypothetically could be 30ppb but the default is 10ppb), implement additional Chemical Treatment. This is the lowest acreage but highest cost. The second path could be to implement the managed wetland for 50ppb now, then implement an addition if the numeric standard is set for 30ppb. This is slightly less cost compared to decision path 1 but much more acreage. Also, this does not leave the decision-maker in a position to implement 10ppb if needed. The third decision path could be to implement STA for 50ppb now, then when the final numeric standard is set, "bolt-on" chemical treatment for either 30ppb or 10ppb as needed. At 30ppb, this is still less acreage than STA alone and at 10ppb is the least cost compared to the Chemical Treatment alone (the first decision path). Decision path 3 would be the most logical course of action using three criteria: flexibility, cost, and acreage. The acreage is of less concern since the bulk of the work is planned over abandoned/existing agricultural lands rather than pristine wetlands. Additional arguments for decision path 3 include: that the first step (to 50ppb) would be done with the least cost; at the least risk to altering water chemistry; and, initiates removal of phosphorus now while development proceeds on the "bolt on" technology and the nutrient standard. The end of section 3.0 of the PEIS describes the on-going program to develop these. Since the decision on acceptance of the first step, construction of the STAs, depends so much on the second step, the permit instrument includes special conditions for the development of these supplemental "bolt on" technologies and other water quality improvement measures and also for the submission of the plans to implement these measures, including additions to the STAs.

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Discussion here has focused on four technologies because they were viewed as among the more promising and were listed in Appendix M of the PEIS. However, other technologies have promise but, because they have not yet been proven by pilot testing, cannot be evaluated with same level of certainty. The permit requires continued work on these technologies.

c. Compensatory mitigation.

(1) The construction footprint of the works will impact 1,192.6 acres of wetlands, most of which are prior-converted agricultural lands. The STAs will flood an additional 39,946.2 acres, most of which are agricultural lands. The non-agricultural wetlands consist of remnant sawgrass marsh in the Brown's Farm and Rotenberger tracts, or are sawgrass communities in the northern fringes of the Water Conservation Areas. For these areas, the permittee shall acquire by 2003 and, as appropriate, restore and manage approximately 9,320 acres as compensatory mitigation. This will provide 2 acres for every acre directly impacted. The lands impacted are in areas with dry hydroperiod and not providing full function for aquatic fauna. The acquisition of land is expected to result in lands that will be managed/restored for natural values and human recreation placed under control. This is expected to effectively expand the spatial extent of habitat available to an existing public preserve, and so adjacency to such a preserve is a criterion for the acquired sites. The impacted lands are also used for migratory birds and deer, as described in the PEIS, and so these functions are given emphasis in the criteria in the special condition of the permit instrument.

(2) Discharges from all but one of the STAs will be directed over hydropattern restoration features. These are degraded levees across the top of WCA2A and WCA3A and periodically spaced structures in Rotenberger. The PEIS at table 3.0-6 presents an estimated number of acres that would thereby have their hydropatterns improved. The acreage figures are based on the number of 2 mile X 2 mile cells that in a simulation experienced increases in hydroperiod greater than 30 days and where that increase did not overshoot the Natural Systems Model (NSM) by more than 30 days. The total acreage improved is 129,010 acres (or 50 cells) while decreasing hydroperiod is seen in 46,080 acres (18 cells), primarily in West WCA3A. The hydropattern changes from this project are expected to result,

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over a large portion of the Everglades, in a more robust wetland community closer to historic pristine conditions. This regional-size enhancement compensates for some of the localized impacts of the project. However, there are three concerns related to the implementation of the hydropattern restoration and are described in the following paragraphs: WCA-2A in paragraph (3); Rotenberger in paragraph (4); and West WCA-3A in paragraph (5).

(3) WCA-2A. STA-2 is designed to divert water that now flows directly to the southern area of WCA-2, treat that water, and discharge it across the degraded levee along the northern edge of the WCA. Due to the design adopted, STA-2 can only discharge to the northern edge of WCA-2. There is a concern that the discharge at 50ppb of phosphorus (the interim design target) will initiate adverse impact to WCA-2A through the growth of cattail or other ecosystem changes. The alternative was explored in Appendix M of the PEIS to bypass this discharge back to the Miami or North New River Canals until STA-2 discharge met the final numeric and other water quality standards to be adopted by the State. However, this bypass would require the very expensive construction of a canal. As described in paragraph (2) immediately above, there is benefit from initiating hydropattern restoration soon. Therefore, these ecosystem effects were explored in Appendix M, and are described in the following subparagraphs (a) through (d).

(a) The estimates of cattail growth are based on the observed rate of expansion of cattail in WCA-2A from 1973 to 1988. The lower estimate is for the low rate of expansion (expressed as 6.33 acres of cattail growth per ton of phosphorus loading) observed in WCA2A from 1973 to 1982 and the higher figure is based on 17.3 acres per ton observed in WCA2A from 1983 to 1988. The calculations are based entirely on assumption that the linear relationship observed in WCA2A can be extrapolated to the hydropattern works. Although Appendix M provides several tables, the following were calculated based on the same equations: (i) Do nothing (150ppb to canal from December 1996 to December 2006 at 25.6 tons phosphorus per year) equals 10 years X 25.6 tons X 6.33 acres/ton (low rate) = 1,620 acres or 10 years X 25.6 tons X 17.3 acres/ton (high rate) = 4,429 acres at existing discharge points; (ii) Proposed Plan (3 years of 150ppb going to existing canal (December 1996 to February 2000) plus 3 years of 50ppb going to hydropattern (February 2004 to December 2006) with the first four years of hydropattern (February 2000 to

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February 2004) expected not to grow cattail) equals acres at canal (existing point of discharge) = 486 (low rate) to 1328 (high rate) acres plus acres downstream of hydropattern = 226 (low rate) to 618 (high rate) acres for a total acres of cattail (all locations) = 712 (low rate) to 1946 acres (high rate). This represents a 44% reduction in acres of cattails over the "do nothing".

(b) This 44% reduction is based on the assumption phosphorus loadings will continue at the rate from the past. More recent data on the better than expected performance of the BMPs indicates phosphorus loading may be much less than originally described in the PEIS. For example, the PEIS reports the reduction in metric tons would range (depending on the year) from 41% to 52% over the "no action plan". Using average BMP for the last three years, this reduction was calculated by one commentator to be in the range of 21% to 25%. Using BMP performance for the most recent year, in the range of 4% to 5%. Since the rate of cattail growth is linearly related to the tons of phosphorus, the reduction in cattail acres would be equivalent. The same commentator stated data indicated that the "nutrient front" downstream of S-10 is not advancing. If true, then the rate of acres of cattail growth per ton of phosphorus may also be less than the linear estimate used in paragraph (a). In any case, the better than expected BMP performance will reduce the potential for growth of cattail (and other ecosystem effects caused by phosphorus loading) downstream of STA-2.

(c) The "time lag" in subparagraph (a) that cattail will not grow in the first four years of discharge is based on an assumption that there is a period of time while phosphorus accumulates in the soil to a level that then "triggers" cattail growth. The PEIS presents a draft mass-balance model that simulates, for a given discharge flow, the change in water column and soil phosphorus concentrations over time and distance from discharge. This allows the calculation of the length of time before the soil phosphorus reaches the concentration that is thought to "trigger" cattail growth. The simulation for STA-2 estimated the time would vary from 2 to 10 years, with 6 to 7 years using the "medium" trigger threshold at 50ppb discharge, but with increased volume of flow but at 40ppb, the time increases to a range of 2 to 15 years, with the "medium" at 8 to 10 years.

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(d) Periphyton is another part of the ecosystem that will be affected by water column phosphorus concentrations. However, the actual numeric number is still being developed through research. Simulations from the mass-balance model in Appendix M (described by subparagraph (c) immediately above) estimates that 13,600 acres will have water column concentrations exceeding 10ppb, and will occur within 5km of the discharge. If the concentration in the discharge is less the acreage and distance will be less. Based on a satellite map, within 5km of discharge there is only 420 to 739 acres of periphyton community. However, at water column concentration of 30ppb, the simulation estimates 3,737 acres occurring within approximately 1km of the discharge. In any case, in the early years of discharge the elevated water column will be near the discharge point.

(e) Based on the above information, there is little likelihood that a discharge for the first few years would result in an imbalance in natural populations of flora and fauna, and there must be a recognition of the high cost of constructing a bypass as well as the benefits of the hydropattern restoration. Moreover, it is generally understood that there could be impacts on the balance of flora and fauna as the result of re-hydration that are not the result of pollutants in the discharge water. However, the definition of imbalance must reflect the numeric and other water quality standards that are now being developed as provided by law. Also, the current expectations are based on evaluation tools that are not exact: all the results are expressed in fairly wide ranges; based on the ENR and BMP results in the recent year, the results may overestimate potential impacts; the mass-balance model was developed and tested using the same data-set; data used for simulations for WCA-2A were not necessarily based on field data taken immediately downstream of STA-2. Therefore, the permit authorizes the discharge of flow, but with two conditions. First, the effect on the ecosystem will be evaluated two years after discharge to confirm the expected outcome, adjust for actual conditions, and to refine the predictions of further discharge and the nature of future actions. This will include before and after differences in field observations and comparison with the mass-balance model calibrated to the actual discharge location, and, if necessary, the implementation of a remedial plan if effects are unacceptable. Second, the permittee shall implement, within four years after discharge, any necessary water quality improvement measures to meet the standards to be adopted by rule. This is to

keep the discharge within the "medium" ranges of the time lag and also reflects the currently scheduled dates for STA-2 and for the rulemaking.

(4) Rotenberger. STA-5 is designed to divert water that now flows directly to the northern area of WCA-3A, treat that water, and discharge it into Rotenberger. Like WCA-2A in paragraph (3) immediately above, there is a concern that the discharge at 50ppb of phosphorus (the interim design target) will initiate adverse impact to Rotenberger through the growth of cattail. Unlike WCA-2A, there is the capability to completely bypass the discharge from STA-5 into the Miami Canal instead of Rotenberger. However, Rotenberger only receives hydration from rainfall, and so it is subject to muck fires and soil subsidence during dry years and degradation which will continue in future years. Also, the history of Rotenberger has left antecedent conditions that may result in the depth and duration of flooding which makes effects of flooding a more controlling factor for cattail growth than the phosphorus concentration of the discharge. Appendix M of the PEIS explored the effects of bypassing this flow and of discharging.

(a) The issue is primarily a question of where to risk growing cattail from the 50ppb discharge. If completely bypassed, all of the risk is at existing discharge locations in WCA-3A. If some of that flow (currently estimated at approximately 50% of the total volume) is diverted to Rotenberger, some of the risk is placed there. In both cases, the total acres of cattail at 50ppb are estimated to be 57% of the growth at 150ppb (using the same calculation process as explained in paragraph (3)(a) immediately above). The mass-balance model estimates a "time lag" from 4 to 20 years. Periphyton communities that could be affected by water column phosphorus changes are probably not present near the discharge.

(b) Based on the above information, there is a risk of initiating cattail growth in Rotenberger, and that risk is an avoidable one. However, the growth could be caused either by hydropattern or by phosphorus increases, or a combination of both. In order to initiate the hydropattern restoration, the permit provides that the restoration be implemented through a series of phased steps. The initial step will be to operate the proposed control structures to control rainwater. Then in subsequent steps 50ppb may be introduced if all the agencies

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agree. The permit provides that the effect on the ecosystem will be evaluated two years after this discharge.

(5) West WCA-3A. The estimates in Appendix M of the hydropattern benefits found that West WCA-3A actually worsened compared to present. This is based on a modeling of the planned discharges. The correction of this must be coordinated with several other planning activities. Therefore, the permit requires the submission of an operating plan that also includes updates of the predictive models such as for hydropattern changes. For West WCA-3A, the works are authorized to be constructed since they provide for bypass capability necessary to provide an adequate supply of water to the Seminole Tribe of Florida. However, discharges across the degraded levee (the hydropattern feature) is not authorized until the discharge meets the numeric and other water quality standards adopted by law.

8. Evaluation of the 404(b)(1) guidelines. See also Appendix E of the PEIS.

a. Factual determinations.

(1) Physical substrate. Muck overlaying limerock. Muck and limerock will be excavated from borrow canals and placed adjacent to the canals.

(2) Water circulation, fluctuation, and salinity. Work within the WCAs are at the northern end where water generally sheet flows from the south during wet years. Work blocks flow. However, operation of project introduces sheet flow from the north flowing to the south, restoring historic flows. Work within remnant Everglades are in areas now receiving only rainfall and are generally dry. Operation of project will result in continuous inundation up to four feet in depth. Work within agricultural areas will result in continuous inundation.

(3) Suspended particulate/turbidity. Will be located in the immediate vicinity of the construction.

(4) Contaminant availability. Within the agricultural areas are locations of soil and groundwater contamination from fuel (for equipment and pumps) and pesticides. The PEIS lists sites in Appendix C and provides discussion at Sections 5.13 and

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6.10. The permit requires completion of removal of contaminants. This will ensure none enter the water column once the area is inundated.

(5) Aquatic ecosystem effects. See paragraphs 9.b.(4), 9.b.(6), and 9.f. of this document.

(6) Proposed disposal site. Placement of material by heavy earthmoving equipment. No mixing zone.

(7) Cumulative effects. The fill is in the form of levees, pump stations, and canals, generally very similar in design and construction to many others in the region.

(8) Secondary effects. None from the construction. Effects from the operation of the structures placed discussed in paragraph 9.b.(8) of this document.

b. Restrictions on discharges.

(1) Alternatives.

(a) The activity is located in a special aquatic site (wetlands, sanctuaries, refuges, mudflats, vegetated shallows, coral reefs, riffle & pool complexes). Yes X No

(b) The activity needs to be located in a special aquatic site to fulfill its basic purpose. Yes X No

(c) It has been demonstrated in paragraph 7 above that there are no practicable nor less damaging alternatives which would satisfy the project's basic purpose. Yes X No

(2) Other program requirements.

(a) The proposed activity violates applicable State water quality standards, section 307 prohibitions, or effluent standards. Yes No X

(b) The proposed activity jeopardizes the continued existence of federally listed threatened or endangered species or affects their critical habitat. Yes No X

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(c) The proposed activity violates the requirements of a federally designated marine sanctuary. Yes___ No X

(3) The activity will cause or contribute to significant degradation of Waters of the United States, including adverse effects on human health; life stages of aquatic organisms; ecosystem diversity, productivity and stability; and recreational, esthetic, and economic values. Yes___ No X

(4) Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Yes X No___

c. Findings. The proposed site for discharge of dredged or fill material complies with Section 404(b)(1) guidelines with the inclusion of the conditions described within this document.

9. Public Interest Review:

a. Corps analysis of comments and responses. All comments received in response to the Public Notice have been considered in the following public interest review.

b. All public interest factors have been reviewed. The following public interest factors are considered relevant to this proposal. Both cumulative and secondary impacts on the public interest were considered.

(1) Conservation. The project provides for the reduction in the degradation of the Everglades and provides for hydropattern restoration.

(2) Aesthetics. The main visual features of the project, low levees, canals, water control structures, pump stations, and marshes, are not unlike existing features in the area.

(3) General environmental concerns. Described in Section 6.0 of the PEIS, further discussed in paragraph 7, and in more detail elsewhere in this document.

(4) Wetlands. Discussed in detail at Section 6.1 of the PEIS. Direct construction impacts (excluding STA-3/4) total 1,081.4 acres consisting of: 141.6 acres within the northern

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edges of the WCAs; 698.1 acres of remnant Everglades within STA-2 (Brown's Farm) and Rotenberger; 664.2 acres of agricultural land; and 11.2 acres of canal littoral zone. In addition, the works authorized will result in the flooding, of depths up to 4 feet, of an additional 4,460 acres of remnant Everglades and 42,164 acres of agricultural lands. The lands within the WCAs are generally sawgrass communities important for wading bird foraging and fisheries, but the areas impacted are generally the driest, most impacted by the canals that route and discharge water south of these areas. The remnant Everglades areas in Brown's farm have converted to a shrub canopy and support a deer population as well as being considered important as a stopover habitat for migratory birds, more detailed discussion found in Appendix N, #53 of the Responses to Comments. The remnant areas within Rotenberger are sawgrass or grass communities that are only hydrated by rainwater since canals have diverted the historic sheetflows. The agricultural areas have been converted from Everglades communities to the management of crops and therefore do not exhibit any native habitat or wetland functions.

A large portion of the agricultural lands would probably be found, upon detailed examination, to not exhibit the hydrology to meet the federal definition of a wetland so long as the drainage structures were maintained up to time of construction. The canal littoral zones are typically mowed or otherwise maintained but the narrow ecotonal edges are used by wading birds for foraging, which, will be replaced by the ecotones along the new canals. The lands are at the northern extremity of the current extent of the native Everglades and, looking at the 141.6 acres of impacts within the WCAs, represent a slight reduction along the fringe but, looking at the flooding of 42,164 acres of agricultural lands, an expansion of the extent of marshes, albeit not sawgrass. The hydropattern improvements within the WCAs will more than replace this lost functional capacity along the fringe.

In addition, approximately 9,320 acres of lands in the region will be acquired and, as needed, managed, to provide functional replacement for the remnant areas.

(5) Historic and cultural resources. An assessment performed for all the sites, at Appendix K of the PEIS. 40 targets and nine sites were assessed. Three sites were potentially impacted by the construction of the project and so the permit is conditioned to require, prior to construction, a more detailed assessment of the extent of the site, comparison to the construction footprint, and the implementation of a

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mitigation plan as necessary. There is a pending submission of information that indicates these three sites will not be impacted. The project will not affect the other sites.

(6) Fish and wildlife values. These are discussed in Sections 5.4 and 6.2 of the PEIS. The U.S. Fish and Wildlife Service Biological Opinion is found at Appendix I of the PEIS. In general, the project will improve fish and wildlife values through conversion of agricultural lands to marsh, hydropattern improvements, and the removal of stress on the ecosystem by removal of phosphorus in the incoming surface waters. The single largest concern expressed for this factor is the potential for bioaccumulation of mercury resulting from the project. This is discussed at length in the PEIS at Sections 5.15 and 6.12 and at Appendices H, O, R, and T. These describe and show the many interpretations of state of knowledge on this subject. For example, one commentator argues that the removal of phosphorus will result in the increase of mercury in the system. Refinement of knowledge is expected as research into this issues proceeds. However, based on the available information, the likelihood is low that the construction and operation of the STAs will have adverse effects. The main areas of concern are: (a) the release into the water column upon initial flooding; (b) contribution or removal of mercury from inflow to discharge; (c) accumulation of mercury in the sediments of the STAs; and, (d) accumulation in wildlife. The permit requires the preparation of a monitoring plan to confirm this expectation and to provide early detection of trends that could, if continued, become a problem.

(7) Recreation. Discussed in the PEIS at Sections 5.14 and 6.11. Limited recreational opportunity will be provided within the STAs, limited so as to prevent establishment of "short-circuits" in the flows and other aspects that would impact on the treatment functions. Brown's Farm, which will be flooded as part of STA-2, now enjoys considerable hunting use. Some of the permit criteria for selection of the lands to be acquired as compensation are designed to provide replacement for this lost recreation.

(8) Water supply and quality. Discussed in the PEIS at Sections 5.11, 5.12 and 6.9.

(a) The fundamental purpose of this project is to provide for the treatment (by removal of phosphorus) and

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distribution (through the hydropattern features) of surface water necessary to support and restore the Everglades ecosystem. The decision to support the immediate loss of existing wetlands and the expenditure of public funds is based on an expectation that this purpose will be achieved. The "success" of the project in these areas must be confirmed by actual information to validate that no overall environmental losses have resulted nor that the expenditures were contrary to the public interest. The effects of the discharge or operation of the project is a direct result of the construction of the project and so this decision must be concerned about the effects of that operation. The permit requires restoration evaluation plans that include monitoring to:

- (i) confirm phosphorus is being removed;
- (ii) identify other currently unforeseen changes that would, if continued, result in an imbalances in natural populations of aquatic flora and fauna; and,
- (iii) evaluate the changes ascribed to hydropattern restoration.

These plans are to be consistent and coordinated with the State plans to prevent administrative duplication.

(b) This permit decision is being issued in the framework an overall decision by the State and Federal governments to concurrently proceed with multiple actions. The concurrent actions are: (i) STA design and implementation (known also as Phase I); (ii) development of a numeric phosphorus and water quality standard; and, (iii) the selection and implementation of "bolt-on" treatment technologies or other water quality measures (Phase II). For the first, Phase I, the permit requires monitoring and remedial plans for unexpected adverse effects that could result from the discharge from the STAs, particularly STA-2 into WCA-2A and STA-5 into Rotenberger. For the second, the permit instrument recognizes that the remedial plans and the submission of plans for Phase II will be based on the numeric criteria adopted by rule. For the third, the selection of Phase II must proceed on a schedule that does not prevent implementation to begin soon after the adoption of the numeric standard. Therefore, the permit requires the use of the default numeric criteria of 10ppb from the law as a interim number for purposes of planning and for preparing design until the final standard is adopted by rule. It is not, as one commentator expressed concern, a "finding" of the 10ppb as a water quality standard. However, for purposes of planning, the 10ppb standard is applied at the point of discharge to: provide a simple design number (selection of a point within the WCA would introduce additional variables); and, provide a conservative

number to prevent inadvertent imbalances in natural populations of flora and fauna. The final numeric standard may or may not incorporate a "mixing zone" for the degraded areas of the WCAs. In any case, based on anticipated schedules, the rulemaking will be completed soon enough to allow for planning and design adjustments. The permit, as expressed in 5(c) above, has been made sufficiently flexible to incorporate by modification subsequent water quality permit conditions imposed in permits issued by the Florida Department of Environmental Protection and the U.S. Environmental Protection Agency and to conform, where possible and consistent with the law and the public interest, this permit to those permits.

(c) The permit requires completion of assessments and removal of soil and groundwater contaminants from the areas to be incorporated into the STAs. A Federal court decree has indicated that portions of the Everglades ecosystem are facing potentially devastating degradation as a result of nutrient laden waters unless restoration activities authorized by the accompanying permit proceed within the specific timeframes. These areas are discussed in the PEIS at Sections 5.13 and 6.10.

c. Describe the relative extent of the public and private need for the proposed structure or work. The public enjoys the many benefits of the Everglades ecosystem. Private benefits include maintenance of agricultural activities.

d. Describe the practicability of using reasonable alternative locations and methods to accomplish the objective of the purposed work where there are unresolved conflicts as to resource use. There are no unresolved conflicts regarding resource use.

e. Describe the extent and permanence of the beneficial and/or detrimental effects which the proposed work is likely to have on the public and private uses to which the area is suited. Most of the areas affected are being taken out of agricultural production. The change is permanent. The beneficial effects associated with the treatment of surface runoff and other purposes would be permanent.

f. Threatened or endangered species. The proposed project will not jeopardize the continued existence or critical habitat of any threatened or endangered species. The U.S. Fish and

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Wildlife Service (FWS) Biological Opinion is found in the PEIS at Appendix I. It finds that, for the Wood Stork: that the water management changes would generally be beneficial in providing more foraging; it is uncertain whether the high nutrient levels within the STAs will lead to high levels of parasite-laden fish; and, continuation of mercury monitoring for bioaccumulation is necessary. The FWS also made several recommendations for actions to prevent taking of the Indigo snake during construction.

g. Corps wetland policy. The proposed wetland alteration is necessary to realize the project purpose and should result in minimal adverse environmental impacts. The benefits of the project would outweigh the minimal detrimental impacts. Therefore the project is in accordance with the Corps wetland policy.

h. Cumulative and secondary Impacts: Discussed also in the PEIS at Section 6.13. There should be no adverse cumulative or secondary impacts caused by the project.

10. Determinations:


a. Compliance with 404(b)(1) guidelines. Having completed the evaluation in paragraph 8 above, I have determined that the proposed discharge complies with the 404(b)(1) guidelines.

b. Public interest determination. I find that issuance of a Department of the Army permit is not contrary to the public interest.

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APPROVED BY:


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